

Appendix E: Methane Emissions: Data Sources and Methods

Appendix E summarizes the data sources and methods used to project methane emissions in the following exhibits:

- Exhibit E-1: Methane Emissions from Landfills, Data Sources and Methods
- Exhibit E-2: Methane Emissions from Coal Mining Activities, Data Sources and Methods
- Exhibit E-3: Methane Emissions from Natural Gas and Oil Systems, Data Sources and Methods
- Exhibit E-4: Methane Emissions from Livestock Manure Management, Data Sources and Methods
- Exhibit E-5: Methane Emissions from Livestock Enteric Fermentation, Data Sources and Methods
- Exhibit E-6: Methane Emissions from Wastewater Treatment, Data Sources and Methods
- Exhibit E-7: Methane Emissions from Other Agricultural Sources, Data Sources and Methods
- Exhibit E-8: Methane Emissions from Other Non-Agricultural Sources, Data Sources and Methods

Exhibit E-1: Methane Emissions from Landfills, Data Sources and Methods

Country	Data Sources	Method / Adjustments
Australia	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Austria	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Belgium	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Bulgaria	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Canada	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Croatia	Corinair	Landfill emissions estimates for 1990 were broken out of the 1990 Corinair aggregate waste estimates using Hungary's disaggregated percentages. Future emissions were estimated by applying Croatia's population growth rate to 1990 emission estimates.
Czech Republic	Second NC / 1999 Inventory Submission	Projections from Second National Communication scaled to 1999 Inventory submission. Projected landfill emissions were broken out of aggregate waste projections using 1995 percentages.
Denmark	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Estonia	Second NC	1990 and 1995 reported for municipal landfills. Emissions assumed to remain constant at 1995 levels for the period 2000-2010.
Finland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
France	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Germany	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Greece	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Hungary	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Iceland	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Ireland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Italy	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Japan	Second NC	Second NC reported emissions estimates for 1990-1994, and projections for 2000, 2005, and 2010. The 1994 estimate was used for 1995. Projected emissions were adjusted to account for mitigation efforts. Refer to Chapter 5 for a discussion of the approach.
Latvia	Second NC	Second National Communication provided estimates only to 2000. Estimates from 2005 -2010 kept constant at 2000 levels.

Exhibit E-1: Methane Emissions from Landfills, Data Sources and Methods (Continued)

Country	Data Sources	Method / Adjustments
Liechtenstein	-----	No reported data.
Lithuania	First NC / 1999 Inventory Submission	First National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Luxembourg	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Monaco	-----	No reported data.
Netherlands	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
New Zealand	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Norway	2000 Inventory Submission	Second National Communication scaled to the 2000 Inventory Submission. Projections were adjusted to account for mitigation efforts. Refer to Chapter 5 for a detailed discussion of the approach.
Poland	Second NC / 2000 Inventory Submission	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Portugal	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Romania	Second NC	Emissions and Projections from Second National Communication. 1995-2010 aggregate waste numbers broken down by 1990 percentages.
Russia	Country Study	Emissions and Projections from Country Study.
Slovakia	Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Slovenia	First NC	First National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Spain	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Sweden	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in Waste in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Switzerland	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission. Landfill emissions estimates were calculated by applying the 1995 landfill percentage of waste to projected waste emissions. Projections reflect measures to divert waste and were adjusted to Business As Usual. Refer to Chapter 5 for a discussion of the approach.
Ukraine	Mitigation Study	Mitigation Study emissions and projections.
UK	2000 Inventory Submission / UK Study	Emissions and Projections from UK study – 'Projections of Non-CO2 Greenhouse Gases for the UK', March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-2: Methane Emissions from Coal Mining Activities, Data Sources and Methods

Country	Data Sources	Method/ Adjustments
Australia	2000 Inventory Submission / Second NC	Second National Communication projections scaled to 2000 Inventory Submission. Estimates for 2000 and 2005 were interpolated.
Austria	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Belgium	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Bulgaria	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Canada	2000 Inventory Submission / Second NC	Projections from Second National Communication aggregate projections of fugitive emissions broken down using historical percentages and then scaled to 2000 Inventory Submission.
Croatia	-----	No reported data.
Czech Republic	1999 Inventory Submission / Second NC	Projections from Second National Communication scaled to 1999 Inventory submission.
Denmark	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Estonia	Second NC	No reported data.
Finland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
France	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Germany	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Greece	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Hungary	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Iceland	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Ireland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.

Exhibit E-2: Methane Emissions from Coal Mining Activities, Data Sources and Methods (Continued)

Country	Data Sources	Method/ Adjustments
Italy	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Japan	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to 2000 Inventory Submission. Projections were a part of aggregate emissions from fugitive fuels (coal & oil/gas). These estimates were broken down using 1995 fugitive emission proportions.
Latvia	Second NC	No reported data.
Liechtenstein	-----	No reported data.
Lithuania	Second NC	No reported data.
Luxembourg	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Monaco	2000 Inventory Submission	No reported data.
Netherlands	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
New Zealand	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to 2000 Inventory Submission. 2000, 2005, and 2010 projections are aggregate fugitive emissions, broken down using 1995 percentages.
Norway	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to 2000 Inventory Submission. 2000, 2005, and 2010 projections are aggregate fugitive emissions, broken down using 1995 percentages.
Poland	Second NC / 2000 Inventory Submission	Emissions from second National Communication and are projected to decrease by 15% from 1995 levels by 2010, a 5% reduction every 5 years. Refer to Chapter 5 for details.
Portugal	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Romania	Second NC	Emissions and Projections from Second National Communication.
Russia	2000 Russian Coalbed EPA Study	Emissions and Projections from EPA study.
Slovakia	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to 2000 Inventory Submission.
Slovenia	First NC	First National Communication provided only 1990I emissions. Estimates from 1995-2010 kept constant at 1990 levels. Nearby countries also have constant emission projections.
Spain	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Sweden	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.

Exhibit E-2: Methane Emissions from Coal Mining Activities, Data Sources and Methods (Continued)

Country	Data Sources	Method/ Adjustments
Switzerland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Ukraine	Mitigation Study / PEER (2001)	Projections from mitigation study scaled to Ukrainian historical emission estimates.
UK	2000 Inventory Submission / UK Study	Projections from <i>Projections of Non-CO2 Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-3: Methane Emissions from Natural Gas and Oil Systems, Data Sources and Methods

Country	Data Source	Inventory/Projection Estimate Adjustments
Australia	2000 Inventory Submission / Second NC	Second National Communication 2010 projection broken down using historical percentages and then scaled to 2000 Inventory Submission. Estimates for 2000 and 2005 were interpolated.
Austria	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Belgium	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Bulgaria	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to the 2000 Inventory Submission.
Canada	2000 Inventory Submission / EU Sector Report	Projections from Second National Communication aggregate projections of fugitive emissions broken down using historical percentages and then scaled to 2000 Inventory Submission.
Croatia	Corinair	No reported data.
Czech Republic	1999 Inventory Submission	Projections from Second National Communication scaled to 1999 Inventory submission.
Denmark	2000 Inventory Submission / Second NC	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Estonia	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Finland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
France	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Germany	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Greece	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Hungary	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission numbers.
Iceland	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Ireland	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.

Exhibit E-3: Methane Emissions from Natural Gas and Oil Systems, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
Italy	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Japan	2000 Inventory Submission / EU Sector Report	Second National Communication scaled to 1999 Inventory submission numbers. Future emissions were a part of aggregate emissions from fugitive fuels. These estimates were broken down using 1995 emissions.
Latvia	Second NC	Second National Communication reports fugitive emissions for 2000. All fugitive emissions attributed to natural gas systems. 2000 emissions estimates were held constant for 2005 and 2010.
Liechtenstein	-----	No reported data.
Lithuania	First NC	No reported data.
Luxembourg	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Monaco	-----	No reported data.
Netherlands	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
New Zealand	2000 Inventory Submission / Second NC	Second National Communication projections for fugitive emissions broken down using historical percentages and then scaled to 2000 Inventory Submission.
Norway	2000 Inventory Submission / Second NC	Second National Communication projections for fugitive emissions broken down using historical percentages and then scaled to 2000 Inventory Submission.
Poland	2000 Inventory Submission / Second NC	Second National Communication projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Portugal	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Romania	Second NC	Second National Communication provided emissions and projections.
Russia	Country Study	The Country Study reports disaggregate fugitive emissions for 1990. The 1990 estimates were scaled to the consumption of natural gas fuel use in Russia for 1995 and projected use through 2010.
Slovakia	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Slovenia	First NC	Second National Communication provided only 1990 emissions. Estimates from 1995 -2010 kept constant at 1990 levels.
Spain	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Sweden	2000 Inventory Submission / EU Sector Report	Projections from 'Economic Evaluation of Emission Reductions of Methane in the Extraction, Transport, and Distribution of Fossil Fuels in the EU' (AEA Technology Environment, 2001) scaled to the 2000 Inventory Submission.
Switzerland	2000 Inventory Submission / Second NC	Second National Communication projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Ukraine	Mitigation study	Emissions and Projections from mitigation study.

Exhibit E-3: Methane Emissions from Natural Gas and Oil Systems, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
UK	2000 Inventory Submission / UK Study	Emissions and Projections from <i>Projections of Non-CO2 Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-4: Methane Emissions from Livestock Manure Management, Data Sources and Methods

Country	Data Source	Inventory/Projection Estimate Adjustments
Australia	2000 Inventory Submission / Second NC	Second National Communication projections broken down using historical percentages and then scaled to 2000 Inventory Submission. Consistent with livestock production data.
Austria	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Belgium	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Bulgaria	2000 Inventory Submission / Second NC	Second National Communication projections then scaled to 2000 Inventory Submission.
Canada	2000 Inventory Submission / Second NC	Second National Communication projections then scaled to 2000 Inventory Submission.
Croatia	Corinair	No reported data.
Czech Republic	1999 Inventory Submission / Second NC	Projections from Second National Communication were aggregate. Projections for 2000, 2005, and 2010 were disaggregated based on 1995 breakout of aggregate projections.
Denmark	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Estonia	Second NC	Projections for agricultural emissions assumed to be enteric and manure only and Manure is 13% of total. Projections estimated by applying Ukrainian growth rate to 1995 emission estimate.
Finland	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
France	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Germany	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Greece	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Hungary	2000 Inventory Submission / Second NC	Second National Communication projections scaled to 2000 Inventory Submission.
Iceland	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Ireland	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Italy	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Japan	2000 Inventory Submission / Second NC	Second National Communication projections then scaled to 2000 Inventory Submission.
Latvia	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Liechtenstein	-----	No reported data.

Exhibit E-4: Methane Emissions from Livestock Manure Management, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
Lithuania	First NC	First National Communication provided aggregate agricultural projections, which were broken down by 1990 percentages. 1995 and 2005 interpolated. Used scenario II of projections for 2010.
Luxembourg	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Monaco	-----	No reported data.
Netherlands	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
New Zealand	2000 Inventory Submission / Second NC	Second National Communication aggregate projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Norway	2000 Inventory Submission / Second NC	Second National Communication aggregate projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Poland	2000 Inventory Submission	Projections estimated by applying Ukrainian growth rate to 1995 estimates.
Portugal	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Romania	Second NC	Emissions and Projections from Second National Communication.
Russia	First NC	Historical emissions from First National Communication. Projections were based on the Ukrainian growth pattern. Emissions estimates were consistent with available livestock production data.
Slovakia	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Slovenia	First NC	Second National Communication provided only 1990 emissions. Estimates from 1995-2010 kept constant at 1990 levels.
Spain	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Sweden	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Switzerland	2000 Inventory Submission / second NC	Second National Communication projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Ukraine	Mitigation Study	Reported aggregate emissions from the Mitigation Study were broken out using Estonia and Poland's breakdown of agricultural emissions. Emissions estimates were consistent with available livestock production data.
UK	2000 Inventory Submission / UK Study	Emissions and Projections from <i>Projections of Non-CO2 Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-5: Methane Emissions from Livestock Enteric Fermentation, Data Sources and Methods

Country	Data Source	Inventory/Projection Estimate Adjustments
Australia	2000 Inventory Submission / Second NC	Second National Communication projections broken down using historical percentages and then scaled to 2000 Inventory Submission. Consistent with livestock production data.
Austria	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Belgium	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Bulgaria	2000 Inventory Submission / Second NC	Second National Communication projections then scaled to 2000 Inventory Submission.
Canada	2000 Inventory Submission / Second NC	Second National Communication projections then scaled to 2000 Inventory Submission.
Croatia	Corinair	No reported data.
Czech Republic	1999 Inventory Submission / Second NC	Projections from Second National Communication were aggregate. Projections for 2000, 2005, and 2010 were disaggregated based on 1995 breakout of aggregate projections.
Denmark	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Estonia	Second NC	Projections for agricultural emissions assumed to be enteric and manure only and Manure is 13% of total. Projections estimated by applying Ukrainian growth rate to 1995 emission estimate.
Finland	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
France	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Germany	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Greece	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Hungary	2000 Inventory Submission / Second NC	Second National Communication projections scaled to 2000 Inventory Submission.
Iceland	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Ireland	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Italy	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Japan	2000 Inventory Submission / Second NC	Second National Communication projections then scaled to 2000 Inventory Submission.
Latvia	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Liechtenstein	-----	No reported data.

Exhibit E-5: Methane Emissions from Livestock Enteric Fermentation, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
Lithuania	First NC	First National Communication provided aggregate agricultural projections, which were broken down by 1990 percentages. 1995 and 2005 interpolated. Used scenario II of projections for 2010.
Luxembourg	Second NC	Second National Communication provided only historical emissions. Estimates from 2000-2010 kept constant at 1995 levels.
Monaco	-----	No reported data.
Netherlands	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
New Zealand	2000 Inventory Submission / Second NC	Second National Communication aggregate projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Norway	2000 Inventory Submission / Second NC	Second National Communication aggregate projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Poland	2000 Inventory Submission	Projections estimated by applying Ukrainian growth rate to 1995 estimates.
Portugal	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Romania	Second NC	Emissions and Projections from Second National Communication.
Russia	First NC	Historical emissions from First National Communication. Projections were based on the Ukrainian growth pattern. Emissions estimates were consistent with available livestock production data.
Slovakia	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Slovenia	First NC	Second National Communication provided only 1990 emissions. Estimates from 1995-2010 kept constant at 1990 levels.
Spain	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Sweden	2000 Inventory Submission / EU Sector Report	'Economic Evaluation of Emission Reductions of Nitrous Oxides and Methane in Agriculture in the EU' (AEA Technology Environment, 2001) scaled to 2000 Inventory Submission.
Switzerland	2000 Inventory Submission / Second NC	Second National Communication projections broken down using historical percentages and then scaled to 2000 Inventory Submission.
Ukraine	Mitigation Study	Reported emissions broken out using Estonia and Poland's breakdown of agricultural emissions.
UK	2000 Inventory Submission / UK Study	Emissions and Projections from <i>Projections of Non-CO2 Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-6: Methane Emissions from Wastewater Treatment, Data Sources and Methods

Country	Data Source	Inventory/Projection Estimate Adjustments
Australia	2000 Inventory Submission / Second NC	The 2000 Inventory Submissions reports disaggregated waste estimates for 1995, aggregate waste emissions for 1990 and a wastewater emissions growth rate for 1995 to 2010. The 1990 wastewater emissions were calculated by applying the 1995 waste breakdown to the 1990 total waste emissions. Projections were estimated using the 1995 to 2010 reported growth rate.
Austria	2000 Inventory Submission / Second NC	No projections were available from the Second National Communication.
Belgium	2000 Inventory Submission / Second NC	Projections from Second National Communication for 2000 scaled to 2000 Inventory Submissions with 2005 and 2010 held constant at 2000 levels.
Bulgaria	2000 Inventory Submission / Second NC	Projections from Second National Communication for 2000 scaled to 2000 Inventory Submissions with 2005 and 2010 held constant at 2000 levels.
Canada	Second NC	Projections from Second National Communication for aggregate waste emissions for 2000, 2005, and 2010. Waste projections disaggregated by applying the 1995 breakout.
Croatia	Corinair	No reported data.
Czech Republic	Second NC	Projections from Second National Communication for aggregate waste emissions for 2000, 2005, and 2010. Waste projections disaggregated by applying the 1995 breakout.
Denmark	2000 Inventory Submission / Second NC	Projections from Second National Communication scaled to 2000 Inventory Submission.
Estonia	Second NC	Emissions from Second National Communication for 1990 and 1995 municipal and industrial wastewater. Estimates for 2000 – 2010 held constant at 1995 levels.
Finland	2000 Inventory Submission / Second NC	Emissions from 2000 Inventory Submissions. Estimates for 2000, 2005, and 2010 kept constant at 1995 levels.
France	2000 Inventory Submission / Second NC	Emissions from 2000 Inventory Submissions. Estimates for 2000, 2005, and 2010 kept constant at 1995 levels.
Germany	2000 Inventory Submission / Second NC	Second National Communication aggregate waste projections scaled to 2000 Inventory Submission. Disaggregated waste percentages from 1990 used to disaggregate 2000-2010.
Greece	2000 Inventory Submission / Second NC	Emissions from 2000 Inventory Submissions. Estimates for 2000, 2005, and 2010 kept constant at 1995 levels.
Hungary	2000 Inventory Submission / Second NC	Emissions from 2000 Inventory Submissions. Estimates for 2000, 2005, and 2010 kept constant at 1995 levels.
Iceland	Second NC	Emissions from Second National Communication. Estimates for 2000, 2005, and 2010 kept constant at 1995 levels.
Ireland	2000 Inventory Submission / Second NC	No reported data.
Italy	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission. 2005 interpolated from 2000 and 2010.
Japan	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission. Japan reported disaggregated waste emissions for 1990 and 1994 and aggregate "all other" emissions for 2000, 2005, and 2010. 1995 emissions were assumed to be the 1994 estimates. Aggregate projections for "all other" emissions broken down using 1994 breakdown of emissions that make up this category in Second NC.

Exhibit E-6: Methane Emissions from Wastewater Treatment, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
Latvia	Second NC	Emissions and Projections from Second National Communication.
Liechtenstein	-----	No reported data.
Lithuania	1999 Inventory Submission / First NC	Projections from First National Communication scaled to 1999 Inventory submission. Scenario II projections for 2000 and 2010 with 2005 interpolated.
Luxembourg	Second NC	Emissions from Second National Communication. Projections for 2000, 2005, and 2010 kept constant at 1995 levels.
Monaco	-----	No reported data.
Netherlands	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
New Zealand	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Norway	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Poland	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission. 1994 estimate used for 1995. Projections for 2000, 2005, and 2010 kept constant at 1995 levels.
Portugal	2000 Inventory Submission / Second NC	Emissions from 2000 Inventory Submission. Projections for 2000, 2005, and 2010 kept constant at 1995 levels, similar to France/Spain.
Romania	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Russia	Country Study	The Russia Country study reports disaggregated waste emissions for 1990. Estimates for 1995-2010 kept constant at 1990 levels.
Slovakia	Second NC	Emissions from Second National Communication
Slovenia	First NC	Emissions from First National Communication with 1995-2010 held constant at 1990 levels, similar to nearby countries of Hungary and Austria.
Spain	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Sweden	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Switzerland	2000 Inventory Submission / Second NC	Estimates from Second National Communication. 1995 breakout used to disaggregate waste emissions estimates for 2000, 2005, and 2010.
Ukraine	Mitigation Study	Emissions and projections from Mitigation Study.
UK	2000 Inventory Submission / UK Study	Projections from <i>Projections of Non-CO2 Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-7: Methane Emissions from Other Agricultural Sources, Data Sources and Methods

Country	Data Source	Inventory/Projection Estimate Adjustments
Australia	2000 Inventory Submission / Second NC	Second National Communication with 2010 broken down according to 1995 proportions. 2000 and 2005 interpolated.
Austria	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Belgium	2000 Inventory Submission	Only includes rice for 1995.
Bulgaria	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Canada	2000 Inventory Submission	Second national Communication scaled to 2000 Inventory Submission.
Croatia	Corinair	No reported data.
Czech Republic	Second NC	
Denmark	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Estonia	Second NC	Second National Communication
Finland	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
France	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Germany	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Greece	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Hungary	Second NC	Emissions and Projections from Second National Communication.
Iceland	Second NC	Kept constant in projections.
Ireland	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Italy	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Japan	1999 Inventory Submission	Second National Communication scaled to 1999 Inventory submission.
Latvia	Second NC	No reported data.
Liechtenstein	-----	No reported data.
Lithuania	1999 Inventory Submission	
Luxembourg	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Monaco	-----	No reported data.
Netherlands	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
New Zealand	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission
Norway	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission
Poland	Second NC	Second National Communication provides 1994 data, used for 1995. Projections for 2000-2010 held constant at 1995 levels.
Portugal	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Romania	1999 Inventory Submission	Emissions from 1999 submission, which includes rice and field burning. No projections for 1995, 2000, 2005, and 2010.
Russia	Country Study	The Russia Country study reports disaggregate agricultural emissions for 1990. The 1990 estimate was held constant into the future.
Slovakia	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission

Exhibit E-7: Methane Emissions from Other Agricultural Sources, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
Spain	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Sweden	2000 Inventory Submission	No reported data.
Switzerland	2000 Inventory Submission	Second National Communication scaled to 2000 Inventory Submission
Ukraine	Mitigation Study	Emissions and Projections from the Mitigation Study.
UK	2000 Inventory Submission	Projections from <i>Projections of Non-CO2 Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.

Exhibit E-8: Methane Emissions from Other Non-Agricultural Sources, Data Sources and Methods

Country	Data Source	Inventory/Projection Estimate Adjustments
Australia	2000 Inventory Submission	Second National Communication scaled to 2000 Inventory.
Austria	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Belgium	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Bulgaria	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory Submission.
Canada	2000 Inventory Submission / Second NC	Projections from Second National Communication. Kept constant from 2000-2010 at 1995 levels.
Croatia	Corinair	Corinair provided disaggregate 1990 other non-agricultural emissions estimates. These estimates were held constant into the future.
Czech Republic	Second NC	
Denmark	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Estonia	Second NC	Emissions from Second National Communication, with 1995 emissions held constant for 2000, 2005, and 2010.
Finland	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
France	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Germany	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Greece	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Hungary	First NC	First National Communication provides emission estimates. Emissions for 2000, 2005, and 2010 held constant at 1995 levels.
Iceland	Second NC	Emissions from Second National Communication, with projections kept constant at 1995 levels.
Ireland	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Italy	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Japan	1999 Inventory Submission	Second national Communication projections scaled to 1999 Inventory. 2000, 2005, and 2010 disaggregated by 1995 historical proportions.
Latvia	Second NC	Emissions and projections from Second National Communication.
Liechtenstein	----	No reported data.
Lithuania	1999 Inventory Submission / Second NC	Second National Communication using Scenario II, then scaled to 1999 Inventory submission.
Luxembourg	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Monaco	----	No reported data.
Netherlands	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
New Zealand	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory.
Norway	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory.

Exhibit E-8: Methane Emissions from Other Non-Agricultural Sources, Data Sources and Methods (Continued)

Country	Data Source	Inventory/Projection Estimate Adjustments
Poland	Second NC	Second National Communication. 1990 includes fuel combustion and industrial. 1994 emissions used for 1995. 2000-2010 projections by Czech growth pattern.
Portugal	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Romania	Second NC	Emissions and projections from Second NC.
Russia	Country Study	The Russia Country study does not report emissions from other non-agricultural sources.
Slovakia	2000 Inventory Submission / Second NC	Second National Communication scaled to 2000 Inventory.
Slovenia	First NC	Held constant after 1995 based on similar nearby countries such as Italy, Austria, and Hungary.
Spain	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Sweden	2000 Inventory Submission	Emissions from 2000 Inventory Submissions, with 1990-1995 growth rate used to calculate future rates.
Switzerland	2000 Inventory Submission	Second National Communication scaled to 2000 Inventory.
Ukraine	Mitigation Study	Emissions and projections from the Mitigation Study were disaggregated.
UK	2000 Inventory Submission	Projections from <i>Projections of Non-CO₂ Greenhouse Gases for the UK</i> , March 2000.
US	2001 Inventory Submission / EPA 2001b, draft	Projections from EPA 2001b, draft.